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NORTH AMERICAN AIR DEFENSE COMMAND

WIR

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WIR 46/64
13 Nov 1964

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Weekly Intelligence Review

Issue No. 46/64, 13 November 1964

The WIR in Brief

Portion identified as non-responsive to the appeal

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Space

Portion identified as non-responsive to the appeal

COVER: Bomber crew trainer (from Red Star) (OFFICIAL USE ONLY)

NOTE: Pages 28, 29, 32, 33, 36, and 37 of this issue are blank.

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Portion identified as non-responsive to the appeal

Possible New Missile Launched from Tyuratam

An unidentified and possibly new rocket vehicle of at least 2 stages was launched from the Tyuratam missile test range on 23 October. It failed some 5 minutes after launch. Analysis indicates the use of liquid propulsion. It cannot be determined yet whether the new vehicle is to be a space booster or a military missile.

This is the third type of new rocket vehicle to be launched from Tyuratam within the past 12 months: the maiden launches of the SS-9 and SS-10 ICBMs took place on 3 December 1963, and 11 April 1964, respectively.

The use of liquid propellants in the new vehicle is significant but not unexpected: the Soviets' arsenal of solid-propellant vehicles to date is believed to consist principally of boosters for aerospace defense missiles and various small rockets, for which performance is not critical, burning time is short, and great weight is not a factor.

(DIA)

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Very Long-Range Missile Firings May Have Ended for 1964

Soviet ICBM firings to ranges of 6500-7000 n.m. appear to have ended for 1964. The missile-range instrumentation ships which have been monitoring the mid-Pacific impact area, as well as participating in the Voskhod space event, appear to be en route home. The ships do not appear to be redeploying for any forthcoming space events.

Four ICBMs -- three SS-9s and one SS-10 -- were fired to the Pacific impact area since early August, when the instrumentation ships deployed to that area.

(Shemya & Diyarbakir RADINT; US Navy)

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Missile Range Firing Log Presented

US radar detected the following Soviet missile launches between 2400Z, 26 October 1964 and 2400Z, 9 November 1964:

Time & Date	Type	Launch Site	Range
1040Z, 28 Oct	Cosmos 50*	Tyuratam	Orbital
0222Z, 29 Oct	SS-9 ICBM	Tyuratam	3400 n.m.
1208Z, 29 Oct	Unknown	Kapustin Yar	500 n.m.

* Launched by SS-6 ICBM booster/sustainer and injected into orbit by Lunik upper stage.

(Shemya & Diyarbakir RADINT)

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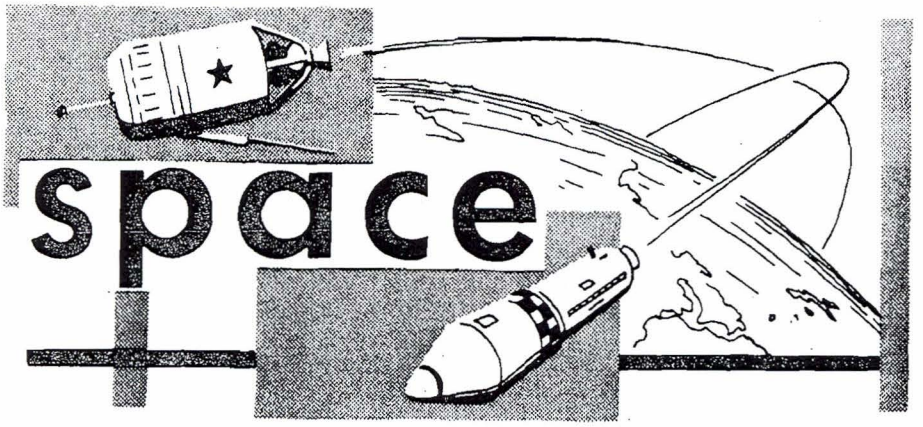
Portion identified as non-responsive to the appeal



significant intelligence on space developments and trends

Redundant Data-Gathering Results from Split in Soviet Space Program

Soviet space activity is divided into two distinct programs:

- One controlled by the Academy of Sciences, which is confined to unmanned scientific data-collection vehicles.
- One controlled by the Soviet Air Force, which includes manned flight, photoreconnaissance, and, possibly, other programs yet to emerge.

The separation between the two programs appears to be so complete that there seems to be a distinct redundancy in certain areas of data-collecting space events, such as the measurement of cosmic radiation.

Many Soviet space vehicles have been measuring cosmic radiation, beginning with the second space launch -- Sputnik 2. The Soviets have reported specific measurements from:

Sputniks 2 and 3
Luniks 1, 2, and 3
Korablya (Spaceships) 2, 3, 4, and 5
Vostoks 3, 4, 5, and 6
Venus 1
TT Cosmoses 4, 7, 9, 10, 12, 13, 15, 16, and 18

Two separate groups appear to be responsible for these measurements:

- A group, headed by L. V. Kurnosova, at the Physics Institute of the Soviet Academy of Sciences.
- A group at Moscow State University, headed by S. N. Vernov.

The experiments and measurements of both groups are similar but there is no evidence of close communications between them, such as co-authorship

of reports of the results of experiments or the customary acknowledgements by one group of work done by the other.

The Physics Institute could be expected to be involved in the Academy's efforts to collect data on conditions prevailing in all parts of space.

The work at Moscow State University, however, has appeared to be anomalous, particularly because of its independence of the work done by the Academy facility. Within the University group, an important subgroup has made radiation measurements on the manned Vostoks as well as on their predecessors; further, it is the only group to report on the radiation-measuring experiments aboard the Tyuratam (TT)-launched Cosmoses, all of which were recoverable and all of which are believed to be involved in a military program of photoreconnaissance. This same group, moreover, has worked with V. V. Antipov, who has been active in physiological research in support of the Soviets' manned space program. This group apparently provides radiation-safety data to the Soviet Air Force in support of its man-in-space program.

The apparent lack of communications between the two groups in their cosmic-radiation measurements extends to other areas, particularly that of physiological research. It is evident that these two elements of Soviet space activity are being kept completely separate.
(FTD)

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Voskhod Crew's Request to Extend Flight Refused; Other Communications Notes

Cosmonaut-Pilot Komarov, about 2.5 hours before the landing of his spacecraft Voskhod 1, reported to the project chief of the flight: "The crew is ready for the final phase of our program, but we request permission to continue the flight for 3 days." A negative reply [redacted] apparently was given, for Komarov a few moments later proceeded to explain his request: "I understand you excellently. Actually we had no such arrangements with you. But in carrying out the flight program, we have encountered many interesting phenomena." The words "complete additional" were also heard.

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The Soviet press has reported that the cosmonauts had asked to spend an additional day in orbit and that the request was refused, but available evidence clearly shows that Komarov used the words "3 days."

Komarov's remarks contradict Western press speculation that the flight was to have lasted 3 days but that it was brought down early, either because of technical difficulties or because of political difficulties -- related to the ouster of Khrushchev the next day. The conversation shows that the mission was to last only one day, that the cosmonauts requested an extension, and that their request was refused. Another indication that the flight was

to last only one day is that Cosmos 47, which was launched October 6 and which appeared in all respects to be a rehearsal for the Voskhod operation, also lasted one day. Both spacecraft flew 16 orbits, were in flight almost exactly the same period, and had almost exactly the same orbital parameters. Intercepts of TV from Cosmos 47 (see WIR 41/64) showed dummies aboard the craft.

Other Incidents. [redacted] Voskhod flight as follows:

- Feoktistov, the Cosmonaut-Scientist, and Yegorov, the Cosmonaut-Physician, changed seats in flight. A Soviet ground station apparently wanted to know when the change was made and whether the telemetry sensor cords had been changed concurrently, for Cosmonaut-Pilot Komarov replied that the seat change had been made on the 9th orbit and he also referred to the telemetry sensor cords. [redacted]
- Physiological data was to have been transmitted during Orbit 12, [redacted] This message probably referred to physical checks which Cosmonaut-Physician Yegorov reportedly made on his fellow cosmonauts while in orbit.
- Several references were made to maneuvers -- changes in spacecraft attitude only. Changes were made in the pitch plane at 0930Z and, possibly, in the yaw plane from 1125Z to 1210Z. During the 13th orbit, Komarov was told to orient the ship manually after calibrating the "VKU" (meaning unknown) when the ship came out of the Earth's shadow at the end of the 13th and the beginning of the 14th orbits. He was authorized for this purpose to "expend 20-25 atmospheres" of the fluid used for manual orientation but was told not to let the remaining pressure drop below 70 atmospheres. Komarov later reported that this orientation was executed between 0408-0439Z and that 10 atmospheres of the "working agent" had been expended. (Open Soviet sources say an ion engine was used for attitude control. See next WIR article.)
- Cabin instrument readings were reported on Orbits Zero, 1, 2, 4, 5, 12, and 15. Items reported included:

Cabin pressure	1.1-1.2 atmospheres
Humidity	58-75.8 percent
Temperature	18-22 degrees C. (64.4-71.6 degrees F.)
Carbon dioxide	1.1-1.7 percent
Oxygen	180-200 mm Hg.
Instrument compartment pressure	Constant at 1.2 atmospheres
Pressure in the manual orientation system	145 down to 95 atmospheres

Pressure in the automatic orientation system	
First:	145 down to 130 atmospheres
Second:	Constant at 145 atmospheres
Pressure in the retrorocket unit	Constant at 320 atmospheres

These limits and variations are similar to readings reported for the Vostok manned operations.

- Checks and corrections were made on the "globus," a globe-shaped instrument covered by a map of the Earth. The globus shows the cosmonaut the approximate part of the Earth over which he is flying.
- Absent from the Voskhod transmissions were the data for manual descent (emergency de-orbit instructions) which had been given for most orbits during the Vostok flights.

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Communications: Difficulties and Technical Data. Reception of Voskhod transmission was extremely poor [redacted] -- and apparently also at Soviet ground stations -- between the early part of Orbit 7 and the early part of Orbit 12. [redacted] Orbits 8 and 9 and only meager communications were noted during Orbits 10 and 11. After good communications were restored, the cosmonauts said that they had been receiving and transmitting during the period in question but Soviet stations apparently could not receive the transmissions. Komarov, for instance, said that he had answered 10 times a question which had been asked repeatedly by one Soviet ground station.

Several times during the period of poor communications, Voskhod flew over the Central Pacific, where Soviet missile-range instrumentation ships had been specially deployed for the space event. There is no known evidence, however, that the spaceship made any attempt to communicate with the surface ships, despite its inability to communicate with ground stations. Cosmonaut Bykovsky communicated with these ships during the flight of Vostok 5 and, presumably, the ships were prepared to communicate also with Voskhod.

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Vostoks 5 and 6, which were launched in June 1963, used all the [redacted] of their predecessors, Vostoks 1-4. Voskhod, however, used only [redacted]

One personality, known as "No. 20" [redacted], apparently was the Chief Designer of Spaceships. He frequently contacted Voskhod directly from Moscow, and he was the individual to whom the request for extension of the flight was directed. "No. 20" appears to exercise over-all control of every phase of Soviet spacecraft operation.

(Various sensors)

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New Systems of Voskhod Described in Red Star

An article in the 27 October issue of Red Star by Lieutenant General of Aviation N. Kamanin, titled "From Vostok to Voskhod," reported that the newer spaceship incorporated a number of new features, besides being larger:

- It had 2 retrorocket installations. The second was termed a "reserve" installation. Kamanin stated that its presence made it safe to inject Voskhod into an orbit having an apogee of 400 kilometers (216 n.m.) -- much higher than that of the Vostoks.
- The cosmonauts' seats had been improved to enable the occupants to withstand better the G-forces of blastoff and re-entry. Each seat was built to fit its occupant.
- A new TV system transmitted to Earth pictures not only of the Voskhod crew but also pictures of space. The crew could use this system to see beyond the instrumentation section and retrorocket installation, something not possible for the passengers of the Vostoks. As Cosmonaut-Scientist Feoktistov said, the new TV installation served as an additional "window" for the cosmonauts.
- A new landing system enabled the spaceship to land at nearly zero speed, the parachute system being able to slow it down from a speed of 220 meters (660 feet) per second at an altitude of 5 kilometers (2.7 n.m.).

The system of orienting the ship in flight was said to be new, allegedly an ion engine, and communications were said to have been improved. A new

communications feature, not necessary before, was an intercom for the crew members.
(Red Star)
(UNCLASSIFIED)

Comparison of 2 Lunar Probe Trajectory Techniques Amplified

The table "Soviet Lunar Probes -- a Comparison of the Two Trajectory Techniques" which appeared on page 32 of last week's WIR is republished on page 38 of this issue. The only change is the inclusion of the 4th (interplanetary) stage in the propulsion used in parking orbit events. This is the propulsion stage that injects the probe from parking orbit into trajectory toward the target.
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Cosmos 50 Comes Apart, Apparently During De-Orbit Attempt

The Soviets probable photoreconnaissance satellite Cosmos 50, which was launched from Tyuratam at about 1040Z, 28 October 1964, broke apart at about 1040Z, 5 November, during the early part of Revolution 130, apparently as an attempt was being made to de-orbit it and recover its film.

This is the Soviets' first de-orbit failure since 1960, when 2 vehicles of the Spaceship (Korabl) series could not be recovered. Spaceship 1, launched 15 May 1960, apparently was injected into a new and higher orbit, instead of being de-orbited, when its retrorockets were fired on 19 May. (The main vehicle decayed 5 September 1962, a fragment of it landing in a street in Manitowoc, Wisconsin. One part of the payload is still in orbit.) Spaceship 3 probably burned up on re-entry when it failed to re-enter the Earth's atmosphere at the proper angle. Since then, the Soviets have had more than 30 consecutive successful de-orbits.

The number of pieces resulting from Cosmos 50's mishap is not known, but 50-60 were believed to be still in orbit on 6 November, after some pieces had probably already decayed. Most of the fragments are between 9 inches and 3 feet in diameter and are tumbling and/or spinning. The majority remained in essentially the same orbit as the original payload, but they are gradually separating in time, that is, the leading piece is now ahead of the last trailing piece in orbit by more than 40 minutes. A few smaller pieces were apparently injected into more elliptical orbits by the force of the explosion.

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none was received thereafter. Thus, the telemetry package apparently remained intact and operable for several hours after the break-up.
(SPADATS; various ELINT sensors)
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Soviet Lunar Probes -- a Comparison of the Two Trajectory Techniques

	Direct Ascents	Parking Orbit Events
Time period	1958-1960	1963-1964
No. of attempts	At least 6	At least 5
Accomplishments	Hard impact; lunar flyby; photographed far side	1 launch successful but missed Moon by 8500 km.
Advantages	Shorter transit time (1.5-2.5 days vs 3.5 days for parking-orbit technique)	Heavier payload than for direct ascent.
Propulsion used	SS-6 booster/sustainer plus Lunik (light) 3d stage.	SS-6 booster/"improved" sustainer plus Venik (heavy) 3d stage, plus 4th (interplanetary) stage.
Launch site	Tyuratam	Tyuratam
Weight of vehicle in parking orbit	(not applicable)	15,000-15,500 pounds
Useful payload weight	800-1,000 pounds	3,135 pounds to lunar vicinity 650-1,000 if a lunar soft-landing 1,550-2,000 if a lunar orbiter
Payload telemetry	50X1 and 3, E.O.13526	

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